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MEMORANDUM

Subject:	Proposed Early Actions – Midas Gold Stibnite Mine Site
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Date:	January 23, 2020

1 Introduction

This memorandum presents three early actions proposed to be incorporated into the Statement of Work ("SOW") for a proposed voluntary Administrative Order on Consent ("AOC") under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 ("CERCLA") being negotiated for the Stibnite Mine Site among Midas Gold Idaho, Inc. ("Midas Gold"), U.S. Environmental Protection Agency ("EPA"), Idaho Department of Environmental Quality ("IDEQ"), U.S. Forest Service ("USFS") and the Shoshone-Bannock Tribes (the "Stibnite Mine Site AOC Participants"). It is prepared at your direction as outside counsel for the Company and has been developed in connection with an on-going site environmental investigation of the Stibnite Mine Site. Recipients of this memo are authorized to disseminate it to the Stibnite Mine Site AOC Participants ("AOC Participants"), and that nothing in this document constitutes a concession by Midas Gold that it is a potentially responsible party ("PRP") under CERCLA.

The early action proposals discussed herein are based on assumptions that early actions:

- Can be developed, agreed to under a final AOC, and scheduled for the 2020 work season, which is typically from July through October;
- Complement the scope of the current SOW as understood by the Stibnite Mine Site AOC Participants; and
- Are designed, as much as practicable, to have a timely impact on ground and surface water quality at the Stibnite Mine Site.

The proposed early response actions included herein are presented with the following qualifications:

1) The customary information development and data analysis processes that would normally precede the execution of these types of response actions have been abbreviated out of necessity to address the concerns of the Shoshone-Bannock Tribes and other AOC Participants that the Site is presently exhibiting poor water quality and is in need of early action; and,
2) The proposals should be considered in conjunction with, and in addition to, the existing components of the current draft SOW.

2 General Site Background

The Stibnite Mining District was a major producer of critical and strategic minerals, as well as precious metals, before, during and after World War II (WWII). At full build-out, Stibnite was a town of 1,500 people with numerous mining related facilities and ancillary features. The District was considered vitally important by the Federal government and the War Department and operations were supported by, and expanded repeatedly, during the war years under direct orders from the War Production Board (J.P. Bradley, March 1949, p.1). The Stibnite area supplied an estimated 90% of the antimony and 40% of the tungsten needed for domestic military manufacturing during WWII. During these early operations, the focus was on production not protection of the environment, and the Site is still heavily impacted in numerous areas today. The area was specifically excluded from the nearby Frank Church – River of No Return Wilderness due to its economic significance and ore deposit potential.

More recent operations focused on heap leaching of gold and silver oxide ores. Complex land ownership, changes in metal prices, extensive litigation and risks associated with environmental liabilities have hampered full scale clean-up and restoration activities in the District. Midas Gold has not operated on the Site, and no viable PRPs remain to fund such clean-up and restoration operations. A full history of the entire Site or the individual areas is beyond the scope of this document, but the reader is referred to summary reports and references therein by Mitchell (2000) and to Appendix C in the MGII Plan of Restoration and Operations (PRO) (Midas Gold, 2016) for additional information.

3 Site Water Quality

Arsenic and antimony are the key surface and ground water constituents of concern ("COCs") identified in the Stibnite Mining District (Brown and Caldwell, 2017), based on baseline water quality monitoring (**Figure 1**). Flow weighted load estimates at five gauging locations by the United States Geological Survey (USGS) (Etheridge, 2015) have identified Meadow Creek and the Bradley Mining Company ("Bradley") Pit reach of the East Fork of the South Fork of the Salmon River ("EFSFSR") as the primary sources of arsenic and antimony in the watershed, with lesser contributions from Sugar Creek and the upper EFSFSR (above the confluence with Meadow Creek). Meadow Creek contributes an estimated 28% of total arsenic and an estimated 37% of total antimony into the EFSFSR. The Bradley Pit reach, upstream of the confluence with Sugar Creek, contributes an estimated 52% of total arsenic and 53% of total antimony (Etheridge, 2015) into the EFSFSR. These reaches are impacted by legacy mining activities, as shown on **Figures 2 and 3**. **Figure 4** depicts the scope and scale of the legacy mining features.

The Midas Gold baseline surface water quality dataset complements the broader spaced sampling and analysis by the USGS, with over 900 water quality samples collected at 8 locations on the EFSFSR, 24 locations on tributary streams, 14 natural seeps, 7 adit seeps and 2 ponds (Brown and Caldwell, 2017). Loading terms for key constituents calculated from concentration and flow data for each sampling event provide additional insight into discrete and diffuse sources of metal and seasonal fluctuations in constituent loading. In addition to tributaries and seeps, additional loads attributable to groundwater seepage or other diffuse sources were calculated on the basis of incremental load increases at surface water monitoring locations. These diffuse loads constitute a significant proportion of arsenic contributions to the EFSFSR, as shown in the 2014 sampling data, where 7 - 13% of the load is from tributaries, 8 - 18% from Sugar Creek, 16 - 36% from Meadow Creek, ~1% from seeps in proximity to adits and 32 - 69% from diffuse loads, for high-flow (May) and low-flow (August) seasons respectively. Antimony loads are similarly sourced, but with a larger proportion associated with diffuse sources. Sampling for 2014 is presented herein as it includes the majority of sample sites, is considered to be representative, and the May sampling coincides with peak runoff. Load estimates were used to prioritize mitigation strategies, as discussed below.

4 Early Action Objectives and Design Approach

Midas Gold considered a broad range of potential early actions with the primary objective of improving surface and ground water quality, with a focus on decreasing total arsenic. Actions that could reasonably be completed during the 2020 work season were preferred. Because the proposal is to conduct interim, and not final, cleanup actions, only actions that are "shovel ready" – meaning capable of being conducted and completed in 2020 and which will make a difference in improving water quality – were considered. Actions requiring mining-scale solutions, requiring appreciable additional field investigations or major engineering in advance of construction, or having a high likelihood or consequence of failure, were eliminated from consideration.

Three early actions have been identified that could feasibly be completed in 2020; all were focused on source control measures to reduce interaction of unimpacted, upgradient water with mineralized legacy waste materials contributing to metal loading in the EFSFSR.

A common feature of all three of the areas proposed for early actions is that relatively clean water from minimally-disturbed upgradient areas in the western, generally unmineralized, side of the Site is known to pass through mineralized materials – chiefly legacy rock dumps and mill tailings. Effective diversion of the water around or past the mine wastes should prevent this relatively clean water from leaching metals from the mineralized rock and thus predictably reduce the metals loading to the downgradient surface waters. The common environmental solution to all three areas proposed for early action is to add or improve upgradient water diversions that would be accomplished with pipes, low-permeability channel lining and rerouting of flow paths.

The environmental solutions proposed are guided by the Site topography, location of the legacy dumps in relation to surface water features, and configuration or presence of existing water diversions. Elevated metal contents, often exceeding various water quality criteria, do exist in surface and ground water in areas of known, but undisturbed, mineralization in the District, and the bypass approach will not remove naturally occurring COCs from the hydrologic system. The existing conditions for these areas, and proposed actions, are discussed in the following sections.

5 Proposed Early Actions

5.1 Bradley Dumps and Hennessy Creek Area

The Northwest Bradley Dumps consist of extensive legacy waste rock dumps covering over 30 acres situated along the EFSFSR southwest of the confluence with Sugar Creek. **Figure 5** provides an overview of the existing conditions for the Bradley Dumps and Hennessy Creek Area.

5.1.1 Sources of Information

The records from early development and later activity in the area of the Northwest Bradley Dumps are limited to historical patent maps, aerial photographs, limited sampling during the 1997-2000 Woodward-Clyde/URS site investigations (URS, 2000); the MSE EE/CA (MSE, 2003); the after-action non-time critical removal action report by MSE for the USFS OSC (USFS, 2004); the MSE Phase I and Phase II site investigations for predecessors to MGII (MSE, 2011a; MSE, 2011b); and various ground and surface water monitoring investigations and characterization studies reported in the baseline Water Resources Summary Report (Brown and Caldwell, 2017) and ongoing studies; and a 2015 auger borehole characterization study (Midas Gold Idaho, Inc., 2015).

5.1.2 Ownership, Location and Access

The Northwest Bradley Dumps are located on private and public land on patented or unpatented lode mining claims controlled by Stibnite Gold Company and Idaho Gold Resources Company LLC respectively. The legacy dumps are of variable age and character and are located just south and west of the EFSFSR below its confluence with Sugar Creek and on the west side of the EFSFSR draining through the former Yellow Pine open pit. Access is along the Stibnite Road – an improved two-lane public county road and by various former mining pit benches and unimproved trails.

5.1.3 Legacy Operations

Data derived from Mineral Surveyor Field Notes, Plats and patent applications indicates that there was exploration and some level of development work here in the 1930s. Patent dates for the northern group of lode claims (the Fair Deal group) covering the area where the USFS Smelter Waste Repository is located are dated May 12, 1933. Patent dates on lodes covering the southern part of the dumps (Hennessy group) are June 18, 1941. Mineral Survey notes and plats for these patents show small discovery cuts, short adits and shallow shafts and were the grounds for patenting at the time of the mineral entry (see U.S. Mineral Surveys MS3246, MS3357 and MS 3397).

The original date of placement of the majority of the materials on the dumps is unknown, but historical photographs show the area elevated above the pre-mining ground surface in the late 1940s and mid-1950s. Extensive development in this area occurred during the WWII era, including construction of water diversions for Hennessy Creek to drive Pelton wheels and for water management, construction of crusher and haul truck load out facilities as well as use of the area for waste rock dumps. The dumps likely were sourced from the Yellow Pine pit and may have been waste rock materials or former stockpiles. Historic photographs suggest the area was used for operation of a screen plant and gravity placer wash plant to recover scheelite (a tungsten-bearing mineral) from former mill tailings mixed with alluvium excavated from the EFSFSR below the Yellow Pine pit in the 1950s (unpublished BMC records). It is also possible that materials from the Springfield Mine may have been processed and wastes placed here.

In the late 1980s, Hecla Mining Company ("Hecla") utilized the dumps as a contractor staging area, for fuel storage sites, as a crusher generator site, and for part of the crusher conveyor and truck loadout system for Homestake Pit mining operations. Records for this activity are limited and permitting for this activity was through the Idaho Department of Lands and associated state agencies (Unpublished records, variably dated, IDL Payette Lakes District Office).

In 2002 and 2003, MSE, under contract with the USFS and EPA, constructed an unlined waste repository in this area to store residual soils contaminated with high levels of arsenic from the former smelter and tailings from various "poison ponds" recovered in two removal actions near the former mill and smelter site (MSE, 2003b).

5.1.4 Environmental Assessment Activities

Shallow hand dug surface samples were collected on the Northwest Bradley Dumps during the 1997-1998 Woodward-Clyde and URS site assessments reported in URS (2000) and indicate the materials on the dumps have highly elevated arsenic and antimony and locally mercury values. Samples collected here by MSE during 2010 also reported high values (MSE, 2011b). Between 2012 and 2013 MGII drilled several groundwater monitoring wells in the dump area to characterize water quality (Brown and Caldwell, 2017). In 2015, MGII completed several auger holes to characterize materials in the dumps after groundwater monitoring wells indicated significantly elevated COCs (primarily arsenic and antimony) in ground water samples (Midas Gold Idaho, Inc. 2015).

5.1.5 Conceptual Model for Metal Loading Associated with Bradley Dumps

Hennessy Creek flows northward in a diversion ditch for approximately 2,200 feet above the Yellow Pine pit and Bradley Dumps before it enters the subsurface and infiltrates the Northwest Bradley Dump. Much of the creek flow into the dump emerges as toe seepage 300-500' to the northeast and flows along the base of the dump before entering a culvert that leads to a swale down to the EFSFSR. Load associated with seepage from the toe of the northwestern dump is estimated to contribute 0.5 to 0.01 kg dissolved arsenic/day on average for high and low flow periods. Additional infiltration occurs along the diversion ditch prior to the Northwest Bradley Dump. Flow measurements taken at monitoring locations T-41 and T-48, above and below the diversion ditch, indicate average infiltration losses of 24%, or total annual losses of approximately 385,000 cubic meters (312 acre-feet) based on monthly average flows. This infiltration rate is approximately four times the total volume of precipitation that falls on the dumps, based on 32" annual total precipitation not accounting for losses related to evapotranspiration.

Shallow groundwater underlying the Bradley Dumps, adjacent to the EFSFSR, has high concentrations of dissolved arsenic and antimony. Dissolved arsenic measured in wells SRK-GM-09 and SRK-GM-10 ranges from 279 to 1100 µg/L with substantially higher concentrations measured in MWH-A19. Monitoring wells MWH-A17 and SRK-GM-04 upgradient of the Bradley dumps have low arsenic concentrations, typically <10 µg/L dissolved arsenic (**Figures 2 and 3**). Elevated concentrations of arsenic and antimony in groundwater are attributed to oxidation of sulfide bearing mineralized rock in the dumps, as sampled in Midas Gold and legacy drilling programs. The low seasonal variability observed in the Bradley Pit diffuse loading term, relative to other sources, as shown on **Figures 2 and 3**, is attributed to year-round infiltration of Hennessy Creek into the dumps. This may exceed the load associated with infiltrating precipitation and snowmelt, especially during drier low-flow periods. **Mitigation measures that reduce infiltration of Hennessy Creek into the Bradley dumps may decrease load to the EFSFSR by approximately 1-2 kg dissolved arsenic/day, depending on groundwater constituent concentrations and hydrologic properties of the dumps. This potential reduction of diffuse load is in addition to the potential load reduction above where Hennessy Creek flows directly into the EFSFSR, as measured at sample site YP-T-48.**

5.1.6 *Proposed Early Action for Hennessy Creek*

Lining and rerouting the Hennessy Creek diversion to a more direct route into the EFSFSR would eliminate the majority of the water (0.72 mi^2 catchment area, lowest measured baseflow 0.15 cfs, estimated 25-year runoff peak 11 cfs) that presently leaks from the existing ditch system and flows in the subsurface through the dumps west of the Yellow Pine open pit and the Northwest Bradley Dumps. Without the perennial flow from Hennessy Creek, wet- and dry-season metals loading associated with the Northwest Bradley Dumps would decrease. Additional wet season decreases in loading would be accomplished by rerouting and piping the existing ditch in the vicinity of the USFS Smelter Debris Repository to reduce the infiltration of water from the remaining catchment (0.16 mi^2 catchment area, estimated baseflow 0.03 cfs, estimated 25-year runoff peak 2.5 cfs) through the dump and/or repository. Rerouting the main Hennessy Creek diversion (**Figures 6 and 7**) would be accomplished with a pipeline leading from the present water collection pond along the Stibnite Road, into the Yellow Pine pit to discharge into the existing pit lake (into deep water to avoid causing turbidity). This may also result in ancillary temperature or water quality improvements in the lake itself. Route options include a direct route eastward down the highwall directly into the lake, or a longer but flatter route along a historical conveyor corridor and roads.

The pipe intake structure would allow overflow into the existing ditch system in the event of a plugged pipe or extreme flood event. An existing earthen diversion dam upgradient of the proposed pipeline intake would continue to manage most debris and bedload, though the pipe intake structure includes a trash rack to prevent either from plugging the pipe. After the main Hennessy Creek diversion rerouting is accomplished, the existing ditch near the repository would be rerouted west of the Stibnite Road in a pipe, to discharge to another existing, unlined diversion ditch beyond the point at which re-infiltrated water could interact with the dump.

5.2 DMEA Adit and Waste Rock Dump Area

The DMEA Adit and Waste Rock Dump Area consists of a portal to an underground exploration drift and associated waste rock dumps and access roads located on the western side of the EFSFSR valley approximately 0.75 miles south of Fiddle Creek. **Figure 8** provides an overview of the existing conditions for the DMEA Adit and Waste Rock Dump Area.

5.2.1 *Sources of Information*

Work in the Defense Minerals Exploration Administration ("DMEA") area was documented in a series of reports under DMEA Docket number 1284. These files are available from the USGS Office in Spokane, WA or on-line from the USGS web server (https://pubs.usgs.gov/ds/1004/scans/id/dma/1284_DMA.pdf accessed 1/5/2019, 10:20AM MT). The initial contract was modified numerous times with amendments after information was gathered as the tunnel progressed and drilling and underground sampling results became available.

5.2.2 *Ownership, Location and Access Considerations*

The DMEA portal and access road to the portal is located on public land administered by the USFS. Access to the former portal and dump is along a narrow unnamed spur trail heading south off the end of the second switchback uphill from the county road on a 2-track 4-wheel drive access trail. The access trail crosses a small gully just past the start of the spur from the switchback that has caused some minor erosion and soil loss after the 2007 fires burned through the area along the slope area above the road. The trail was constructed during the 1920s or 1930s and was used by Bradley, Ranchers, Hecla and the USFS prior to MGII activities; the trail is listed as an unauthorized road in the USFS roads and trails system.

Current MGII authorization for use of the main trail off the County Road is via an approved Plan of Operations. To facilitate access by heavy equipment and/or vehicles larger than passenger vehicles or ATVs, the small creek crossing will require armoring or installation of a short small diameter culvert, brushing and removal of deadfall and possibly some minor live tree cutting. Widening of the trail will not likely be necessary for the proposed activity. A location map showing the location of the portal relative to private land and topography is provided on **Figure 8**, along with profiles through the dump showing the geometry of the fill material.

5.2.3 DMEA Legacy Activities

After supply chain disruptions prior to, during and after WWII, the United States Congress, recognizing the risks to national security of future supply chain disruptions, passed the Defense Production Act (DPA) of 1950 (Ch. 932, 64 Stat. 798 (1950) (codified as amended at 50 U.S.C. app. §§ 2061 et seq. (1982 & Supp. III 1985)). Part of an outgrowth of that Act was the creation of the DMEA. The DMEA program was confined to exploration for critical and strategic minerals and was administrated by the same personnel who had formerly administered an earlier Defense Minerals Administration (DMA) program in the Stibnite area. These programs provided funds and technical assistance to explorers and operators (up to 75% of the costs of exploration in the case of the DMEA program) to locate and develop deposits of critical minerals.

Because of the continued importance of antimony and tungsten to national defense and manufacturing, the Bureau of Mines (USBM), a bureau under the Department of the Interior, conducted significant work in the Stibnite area, including funding 75% of the costs and providing technical assistance, engineering and analytical data to develop the DMEA underground workings. USBM staff directly supervised surface and underground exploration and development work, sampling, analytical work and drilling activities. Work was started and completed in approximately four years under DMA Docket 1284X, Contract Idm-E173, dated October 9, 1951 and seven subsequent amendments. This work covered by the program included 5,778 feet of underground drilling in 27 holes, 4,703 feet of underground crosscut and drift development and 195 feet of raises and extensive sampling and analyses. USBM staff developed and approved the work plans and conducted sampling and analyses. Total cost of the program was $186,158.39 and the government's share was 75% of the total ($139,618.83).

Little remains of the old compressor site or buildings associated with the DMEA activity from the 1950s. However, some of the excavated material was deposited directly outside the portal as an end dump on the adit and compressor station level (cut into granitic bedrock just north of the portal) and the majority of the excavated rock placed into a larger small valley fill waste rock dump (WRD) below the portal. Rail track segments, collapsed timbers, and a small linear depression mark the portal entrance today and interviews with past operators and local residents suggest the portal was last known to be open in the 1960s or possibly even the early 1970s. The WRD currently has seeps from water coming from the now blocked ephemeral stream above the pile of excavated rock material, but also possibly sourced from water seeping out of the now collapsed adit. The WRD toes out at an elevation of roughly 6,545 feet and the crest is around 6,600 feet and is approximately 80 feet wide and approximately 245 feet long. The current area is not crowned and is readily accessible with a 4WD pickup or ATV.

5.2.4 *Environmental Assessment Activities*

The surface expression of the Meadow Creek Fault Zone located above the DMEA workings portal is marked by highly anomalous levels of gold, silver, antimony, tungsten, arsenic and locally molybdenum along its entire length, even in areas without any prior mining or surface excavation activities. The presence of unmined mineralization at depth and the surface expression of this mineralization in conventional -80 mesh soils, -80 mesh stream silts, unimpacted stream surface water and seeps indicates that there are naturally high levels of these elements in the area prior to any exploration or mining activity. MGII has not conducted systematic environmental studies of the DMEA WRD, but URS (2000) reported results from sampling of "soils" from the top and face of the WRD and from near the portal (URS, 2000, Vol. I, Section 8.4, Samples DMEA-1 through DMEA-3) which indicated high levels of arsenic, antimony and mercury in the soil materials in the WRD.

5.2.5 *Conceptual Model for Metal Loading associated with the DMEA Area*

Constituent loading of surface water from the DMEA area is attributed to both adit seepage and the stream impinging on dumps, as determined in the 2003 MSE Engineering Evaluation and Cost Analysis and the earlier URS reports. The stream currently flows northeast along the base of the DMEA dump for approximately 320'. The stream course was pushed southwest from its original channel during dump construction and much of the stream water is believed to flow through the dump toe in the lower 150' of the channel, as evidenced by reduced streamflow and presence of numerous seeps. Seepage from the adit typically infiltrates into the dump within 20' of the portal. Below the dump, the stream and toe seeps flow downslope approximately 150' through multiple small channels and along the roadway to a sedimentation pond and ultimately into the EFSFSR.

Based on 2010-11 MSE Phase I and Phase II site assessments and MGI baseline water quality data, stream water and seep samples collected and analyzed above and below the dump area show an increase in total arsenic. Total arsenic loads associated with DMEA, as measured at T-17, constitute approximately 2% of total arsenic measured downstream of the Stibnite Mine Site at YP-SR-2.

5.2.6 *Proposed Early Action for DMEA Area*

Separation of upgradient water (0.11 mi^2 catchment area, lowest measured baseflow 0.0004 cfs, estimated 25-year runoff peak 1.6 cfs) from the DMEA dump would be accomplished by installation of a culvert alongside the dump, generally along the alignment of the present high-flow channel (**Figure 9**). The culvert intake would include a trash rack to prevent the pipe plugging with debris, and the upstream end of the pipe installed trenched-in sufficiently deep to prevent backwater from the culvert entrance from forcing water into the dump materials. The remainder of the pipe would be laid within or along the present surface channel, with ballast as needed to fix the pipe in place. The outlet would feature riprap erosion protection.

5.3 Former Bradley Mill and Smelter Area

The Bradley Mill and Smelter Area is the site of former legacy mineral processing activities in Meadow Creek valley approximately 0.75 miles southwest of the EFSFSR confluence and is adjacent to Hecla heap leach pad. **Figure 10** provides an overview of the existing conditions for the Bradley Mill and Smelter Area.

5.3.1 Sources of Information

Numerous reports discuss the history of the 1920s-1950s early mining and processing facilities here including: extensive unpublished company records from the Bradley Mining Company (Currier, 1935; Cooper, 1951; Mitchell, 2000). Information on 1980s through 1990s operations here are found in the records of the Idaho Department of Lands Payette Lakes District Office and in the files of the Idaho Department of Environmental Quality. In 1993, Greystone, under a contract with the USFS conducted a Preliminary Assessment and Site Investigation covering this area (Greystone, 1993).

5.3.2 Ownership, Location and Access

The Hecla heap leach facility is located on patented lands currently owned by Stibnite Gold Company. Previous ownership spans nearly 100 years and such discussion is beyond the scope of this document. Adjacent unpatented lode claims are on federal lands administered by the US Forest Service while patented mill site claims are owned by Idaho Gold Resources Company, LLC. The area is readily accessible by an improved county road and there are no impediments to use of large mechanized equipment here for the proposed ditch realignment work.

5.3.3 Legacy Operations

The area is the site of the former Meadow Creek Mine, mill and smelter complex with early mining and beneficiation activities starting in the 1920s and extending through the 1950s. The Meadow Creek Mine was the largest producer of antimony in the United States for many of its operating years and for several years the largest lode gold mine in Idaho. The area included numerous old processing buildings, fuel storage, ponds and tailings disposal facilities.

In the 1980s, Hecla acquired interests to the property after a merger with Ranchers Exploration and Development Corporation who had an option from the underlying owners. Hecla initiated exploration in the area above and around the future site of the heap leach facility later completing geotechnical studies prior to construction of the heap facility. Eventually the former smelter and mill burned and some of the material was hauled off, but much of the former smelter and mill facility residues were buried to the south of the current heap leach pile. The site was later utilized as a heap leach pad and processing facility for Hecla's Homestake Mine located several miles to the north. Hecla's mining and processing operations ceased in the late 1990s and reclamation continued until the mid-2000s.

Hecla rinsed the heaps and added cyanide destructive bacteria and installed an arsenic treatment system to handle high arsenic discharge waters in a shallow land application system in a series of ZVI tanks near the north end of the existing airstrip. The State of Idaho approved the Permanent Closure Report and released the reclamation bond in January 2005 (Hardesty, 2005). The bond release included a stipulation and authorization that, pursuant to Idaho's Ground Water Rule at IDAPA 58.01.11.400.05, Hecla could continue to discharge heap effluent to groundwater and site specific water quality criteria were defined in the amended permit CN-000012A for groundwater affected by the heap effluent through the infiltration galleries as: 2.07 mg/l for total antimony and 4.56 mg/l for total arsenic.

In 2002 and 2003, MSE, under contract with the USFS and EPA, excavated residual soils contaminated with high levels of arsenic from the former smelter and tailings from various "poison ponds" recovered in two removal actions near the former mill and smelter site (Trainor, 2003). In 2009 and 2010 the area was regraded and backfilled, and a large diversion ditch designed to capture and divert surface water from two perennial streams and several seeps at the toe of the slope was removed by contractors at the direction the USFS OSC. The seeps at the base of the hill, that had been the reason for the diversion ditch installation, increased flow shortly thereafter suggesting that the diversion water previously directed into the surface ditch was now percolating into the subsurface and likely encountering and mobilizing metal from the buried mill and smelter materials beneath the fill.

5.3.4 Environmental Assessment Activities

There has been extensive assessment activity in this area associated with pre-process plant and heap leach permitting by Hecla and state agencies as well as site assessments during later operations and closure activities most notably by Greystone (1993), Woodward-Clyde and URS (URS, 2000a; URS, 2000b) and later by MSE (2003) in an EE/CA. In 2015, MGII completed two boreholes (above the heap liner only) to characterize the materials remaining on the leach pad (Midas Gold, 2015). Since 2012, Midas Gold has collected water samples from areas surface seeps, the EFSFSR and from monitoring wells installed in 2012-2013 (Brown and Caldwell, 2017).

5.3.5 Proposed Early Action for Former Bradley Mill and Smelter Area

Installation of a geosynthetic lined ditch and pipe would divert upgradient water around mineralized backfill materials west of Hecla's former heap leach pad (**Figure 11**). A ditch at the upstream end of the new diversion would allow collection of the principal catchments (0.16 mi^2 catchment area, estimated baseflow 0.006 cfs, estimated 25-year runoff peak 2.4 cfs) draining to this area. The lower portion of the diversion would utilize a pipeline for more effective containment, faster construction, and avoidance of excavating potentially contaminated materials in the vicinity of the old smelter stack. Together, the ditch and pipe system would re-establish the effective diversion system that was backfilled at the direction of the USFS in 2009-2010. The pipe outfall would report to an existing ditch that leads to a culvert, which then drains to the Keyway Marsh – with a potential ancillary benefit of providing additional water to support wetland function.

6 Implementation Considerations

Implementation of projects at the Stibnite Mine Site necessarily requires additional logistical considerations due to its remote setting, lack of electrical power, Midas Gold's legal obligation to avoid disturbing a Brownfields site, and lack of standard infrastructure. Midas Gold has some limited support infrastructure, i.e. offices, a small maintenance shop, and a limited support equipment and staff. Housing availability in Yellow Pine can be very limited during the summer recreation season and advance planning and scheduling are required to secure meaningful housing accommodations.

Access into the Project area is limited for support equipment during the spring as load limits are placed on access roads and deliveries of equipment or supplies may need to be broken into smaller loads. Johnson Creek Road is the primary summer and fall access route into the Site and is typically accessible by early to mid June, depending on the winter snowpack. Additionally, Johnson Creek is the only access route that fuel deliveries can be transported in volumes larger than 500 gallons. Midas Gold has additional fuel hauling protocol considerations that need to be followed in support of any action. Adequate fuel storage capacity exists on the Project Site to support all the proposed early actions.

Most stream/seep diversions should be constructed during low flow time periods which are typically the months of August and September, though significant downstream construction can be accomplished ahead of time. Some temporary diversion activity will be required to minimize the generation of sediment when tying into source areas and constructing outfalls.

Conveyance via pipe should be considered preferential over open trenching for constructability. There is a lack of fine-grained soil and/or clay onsite needed in construction of low-permeability lined diversion ditches. Conveyance via pipe would reduce the overall number of heavy trucks on the road and accelerate the constructability of any agreed upon solution. If pipe conveyances are selected, consideration should be given to freeze thaw cycles during the early winter season before an adequate snowpack is available to insulate pipes. Shallow burial or partial burial should be adequate for more significant flows, while deeper burial may be required for lesser flows.

Many of the support, infrastructure and access challenges are eliminated with the approval of the PRO and implementation of the proposed Stibnite Gold Project. The Stibnite Gold Project proposes to install power lines, maintain year-round access, would allow adequate housing and support activities onsite, and allows greater access to equipment and the generation of construction materials onsite through additional materials processing and handling. Further, Midas Gold plans to remove, and if appropriate reprocess, then store legacy mining wastes in appropriately engineered storage facilities. A significant portion of the Bradley waste dumps would be removed through the Stibnite Gold Project, while Hennessy Creek would be temporarily diverted during construction and operations in an engineered channel, then restored to its approximate pre-mining horizontal alignment on closure.

7 Schedule Considerations

When planning work and transport activities, regional activities like the Yellow Pine Music and Harmonica Festival need to be taken into consideration as well as major holiday weekends and fall big game seasons. Public recreation in the backcountry increases substantially during these time periods and over weekends and there is a substantial increased risk of vehicle/equipment interaction. Two of the proposed Project areas are adjacent to or cross public roads. Some limited traffic control may be required in these areas while construction occurs.

July/August/September are recognized as the preferred construction months, but the above-mentioned public activities must be considered. This time period is also prone to wildfires in the back country and air quality and limited visibility can become an issue and limit or halt construction activity. Some construction activities can be extended into October and possibly November, but the risk of inclement weather and substantial snowfall increases dramatically later in the fall. Snowfall, in excess of one foot can occur in the valley floor as early as the middle of September.

Worker schedules and contractor availability should also be considered due to the limited housing in Yellow Pine, and the limited availability of contractors in Valley County to support this type of activity. Typically, Midas Gold equipment technicians work a 14 day on and 7 day off schedule while supervisors work an 8 and 6 schedule. Workdays can vary between 10- and 12-hour days which take advantage of the long summer days. Midas Gold has found that this schedule works well in maintaining worker productivity while reducing the probability of fatigue related incidents.

REFERENCES CITED

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Figures

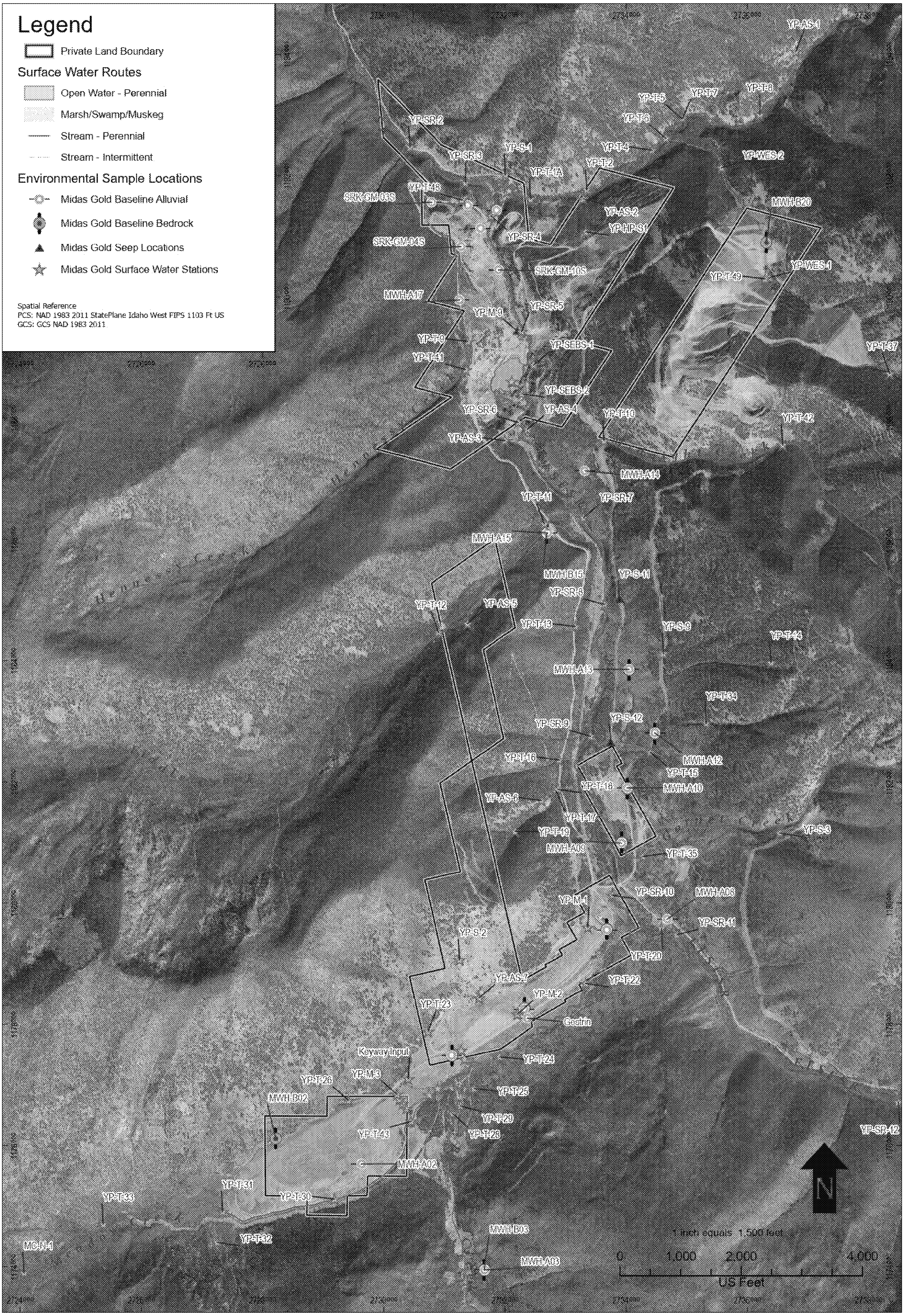

Figure 1 – Water Quality Monitoring Sites

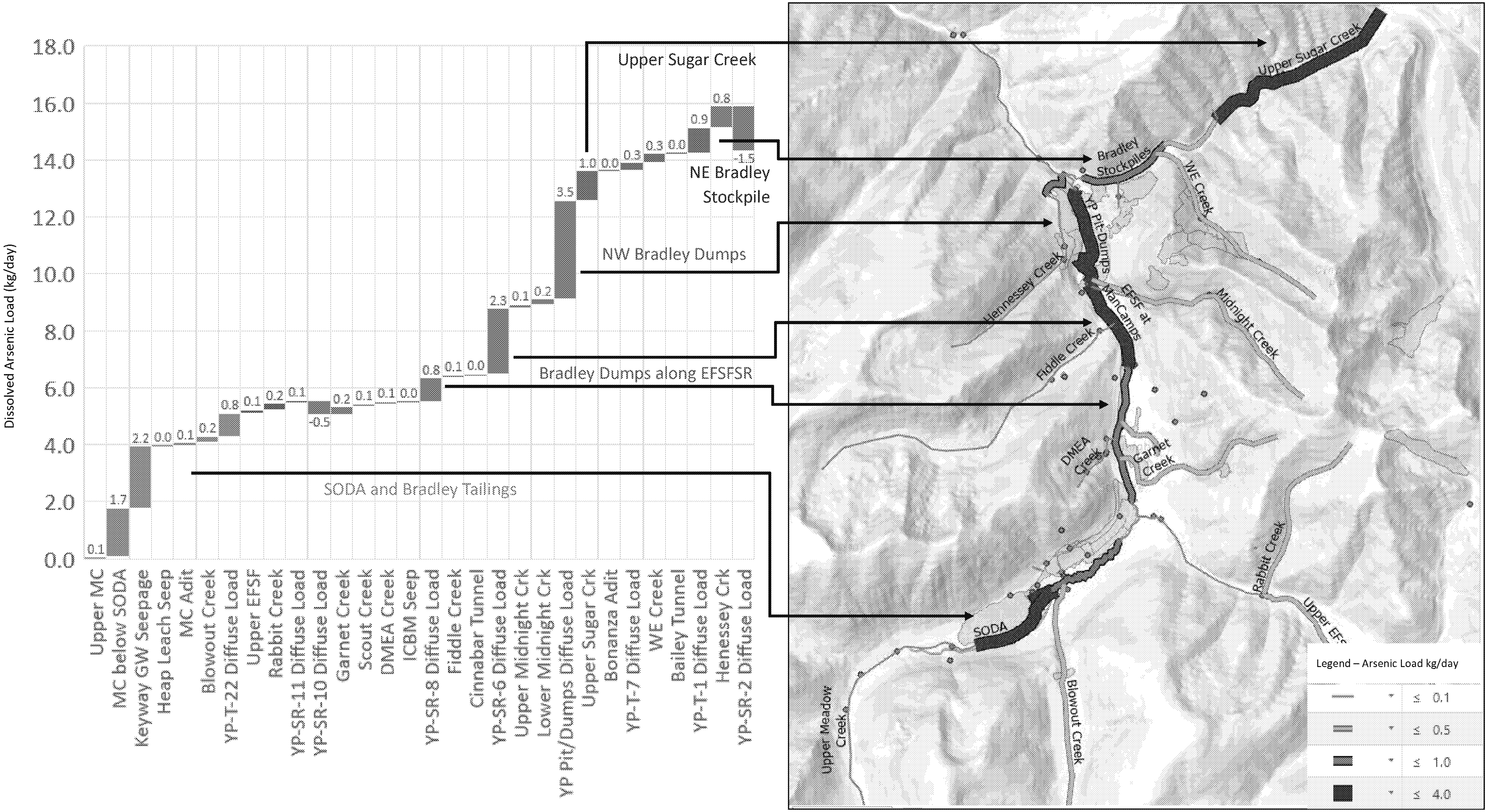

Figure 2 – Incremental Dissolved Arsenic Loads Schematic for May 2014

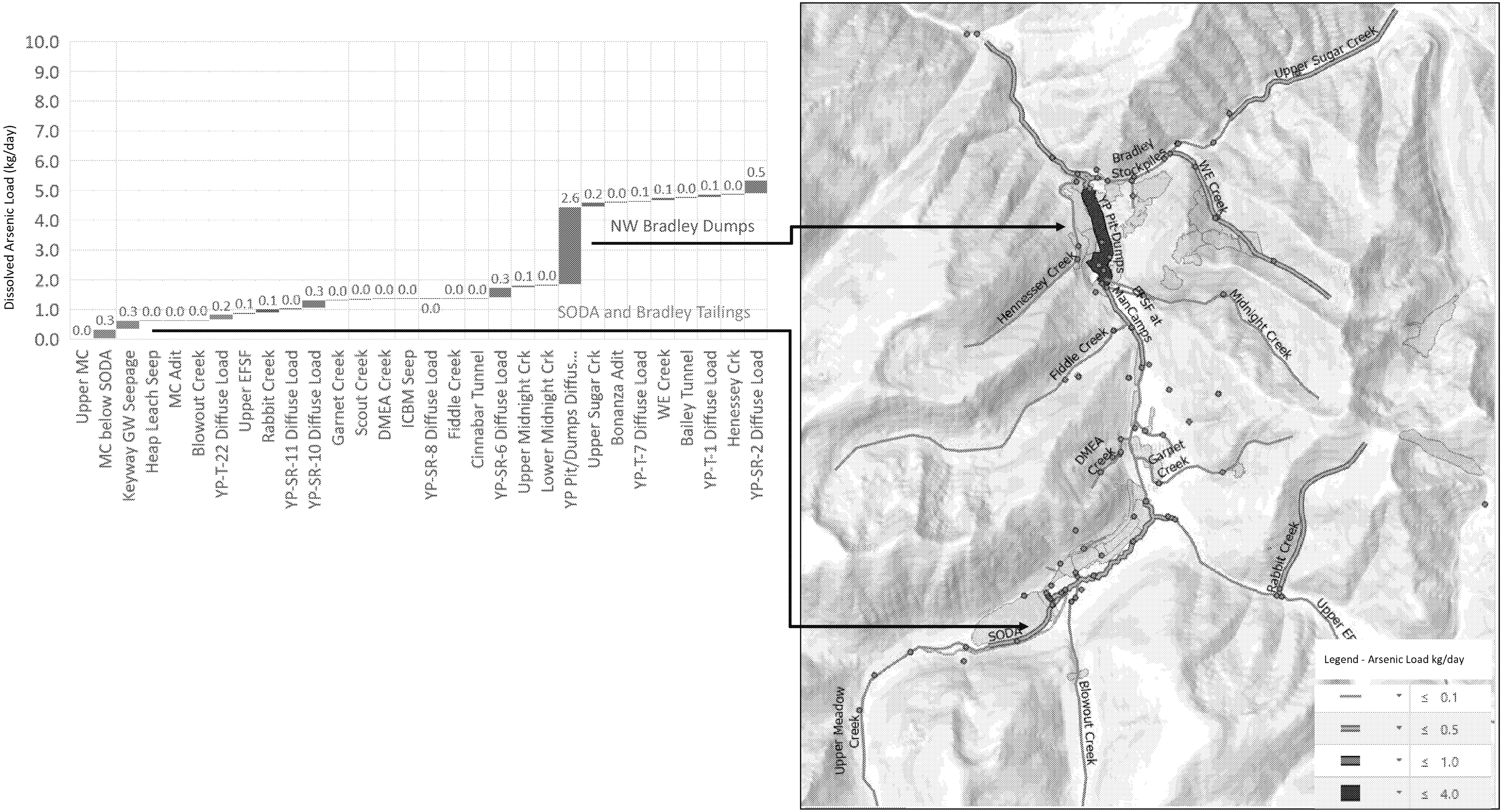

Figure 3 – Incremental Dissolved Arsenic Loads Schematic for August 2014

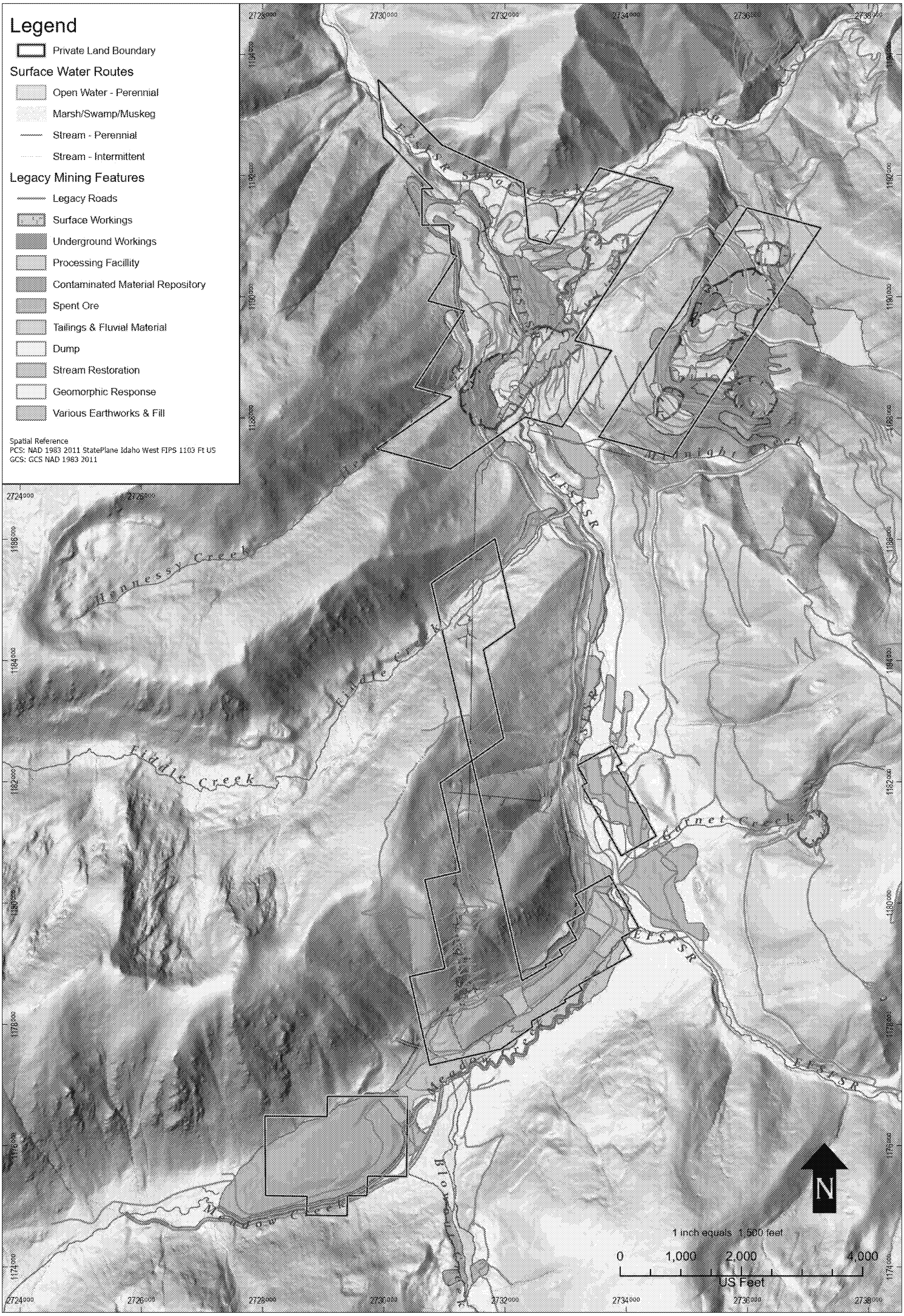

Figure 4 – Historical Mining Impact Areas

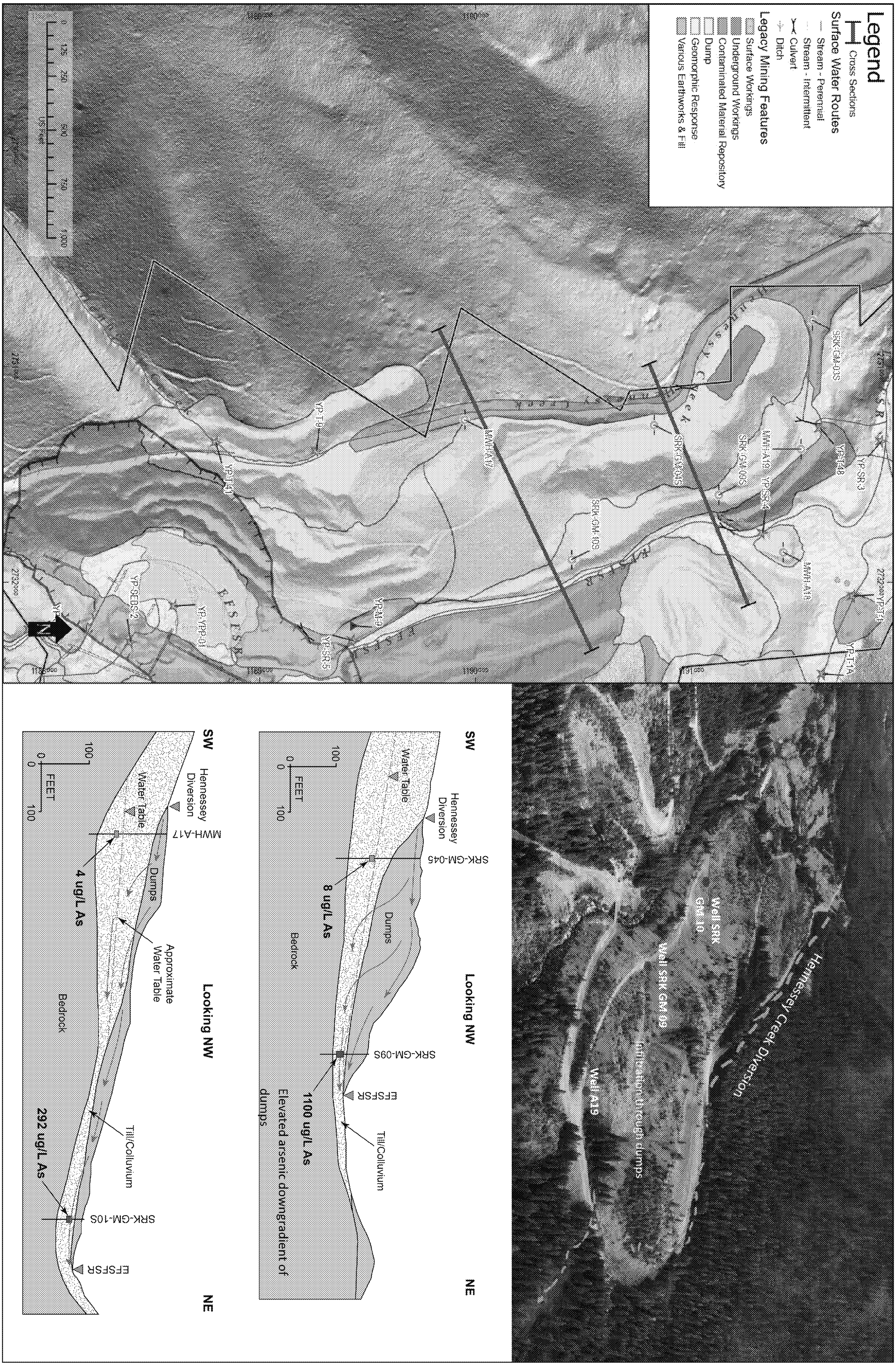

Figure 5 – Existing Conditions for Bradley Waste Rock Dumps and Hennessy Creek Area

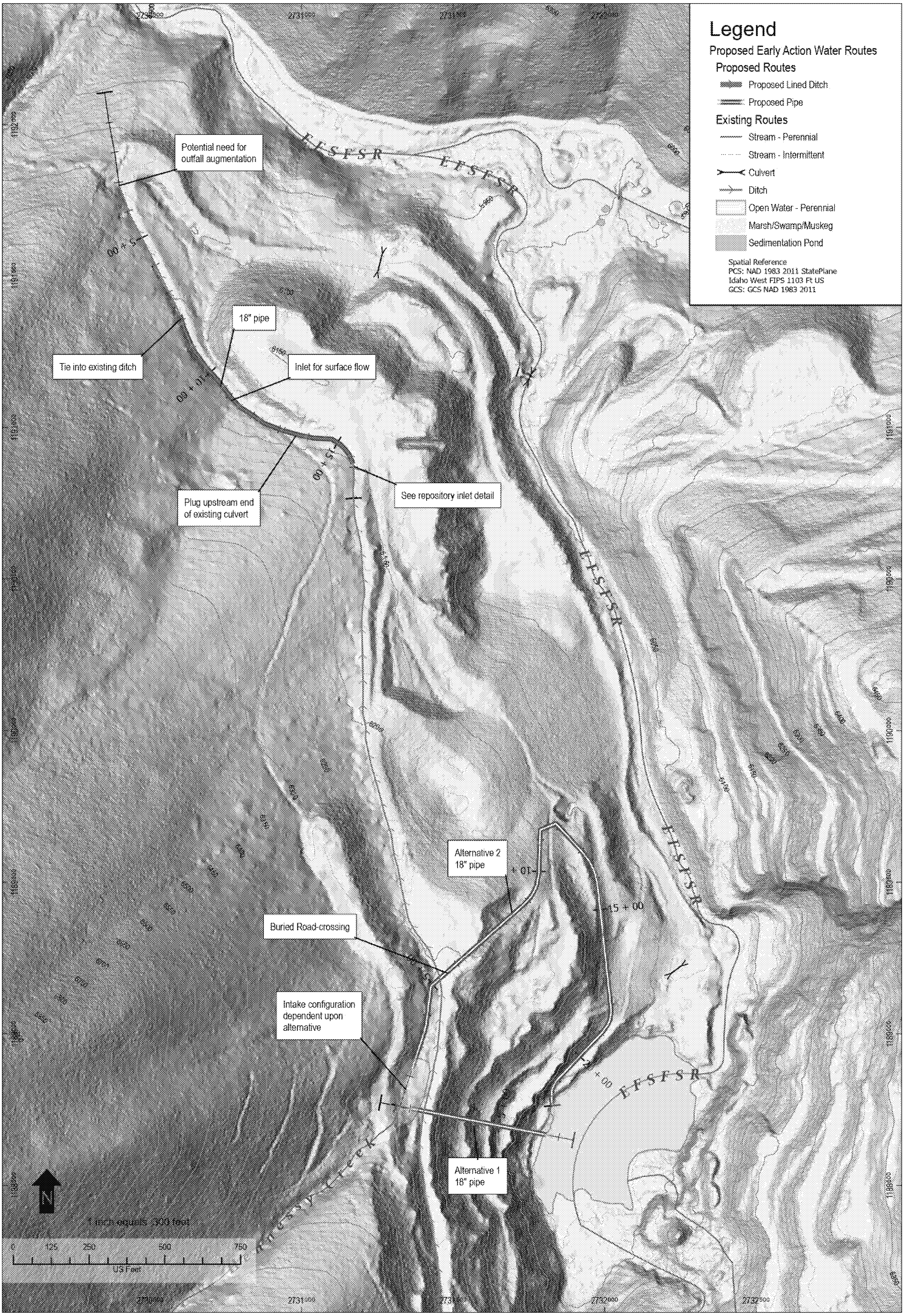

Figure 6 – Proposed Early Action Water Diversion Plan for Hennessy Creek

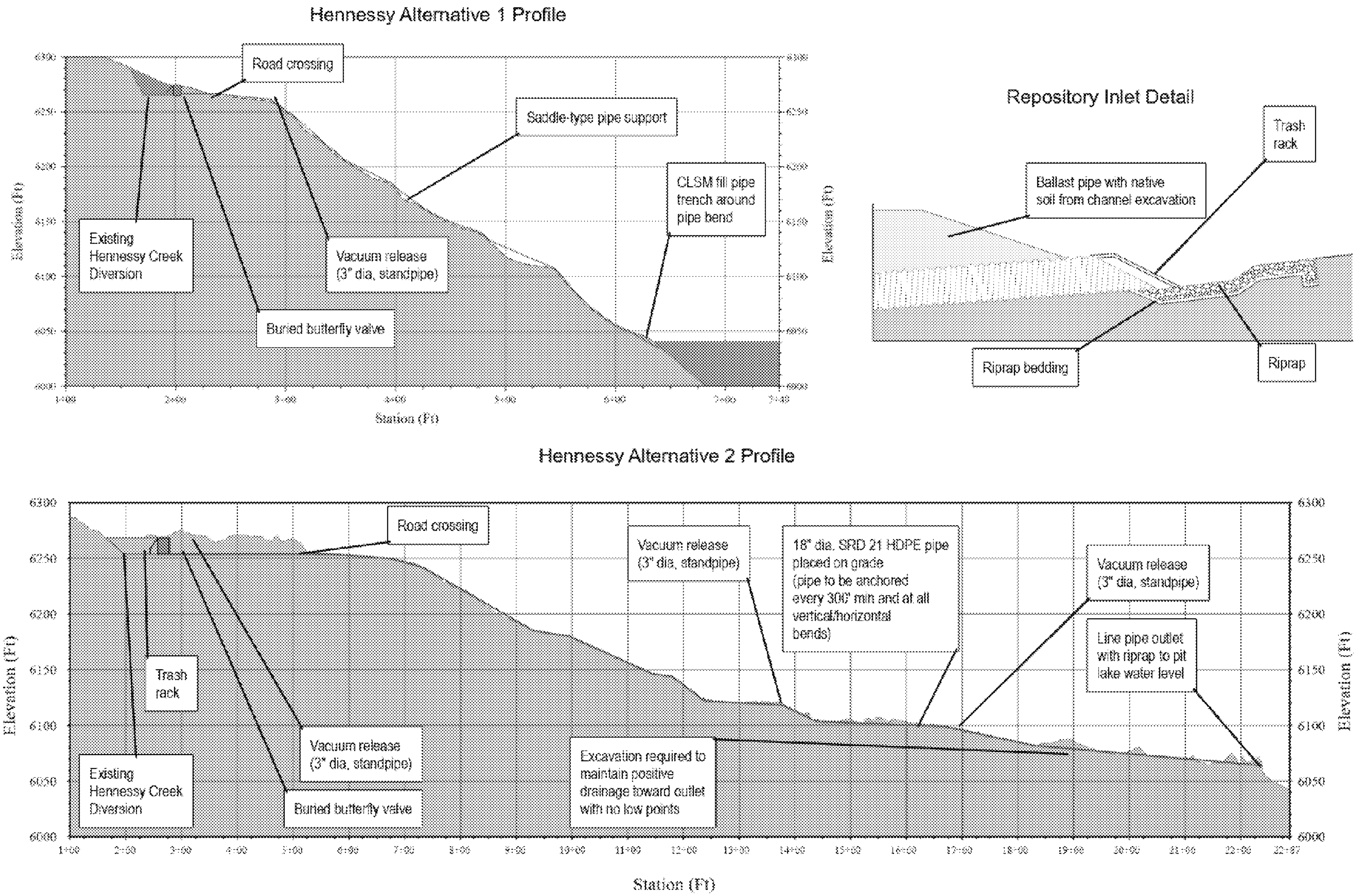

Figure 7 – Proposed Early Action Water Diversion Details for Hennessy Creek

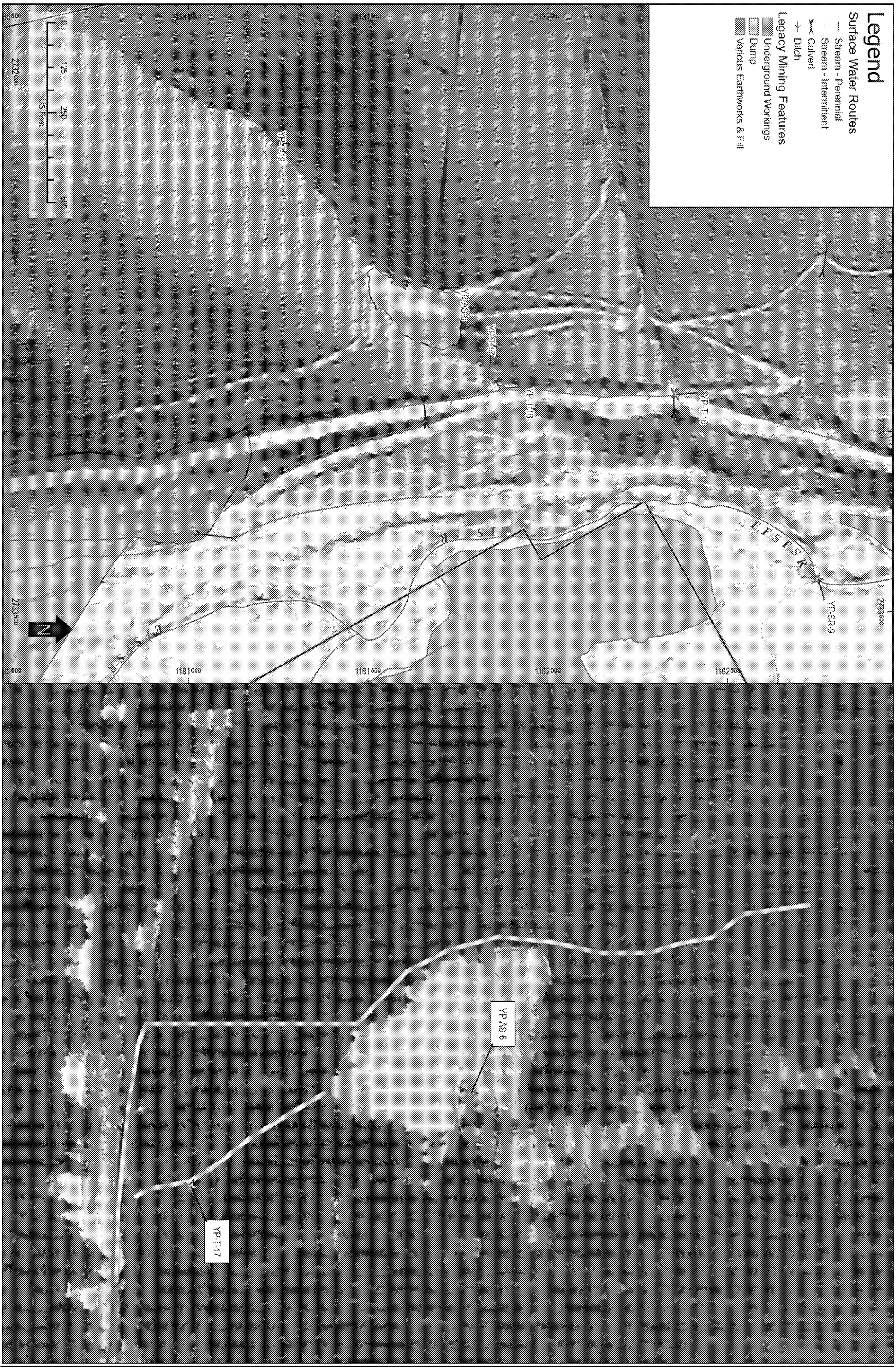

Figure 8 – Existing Conditions for DMEA Adit and Waste Rock Dump Area

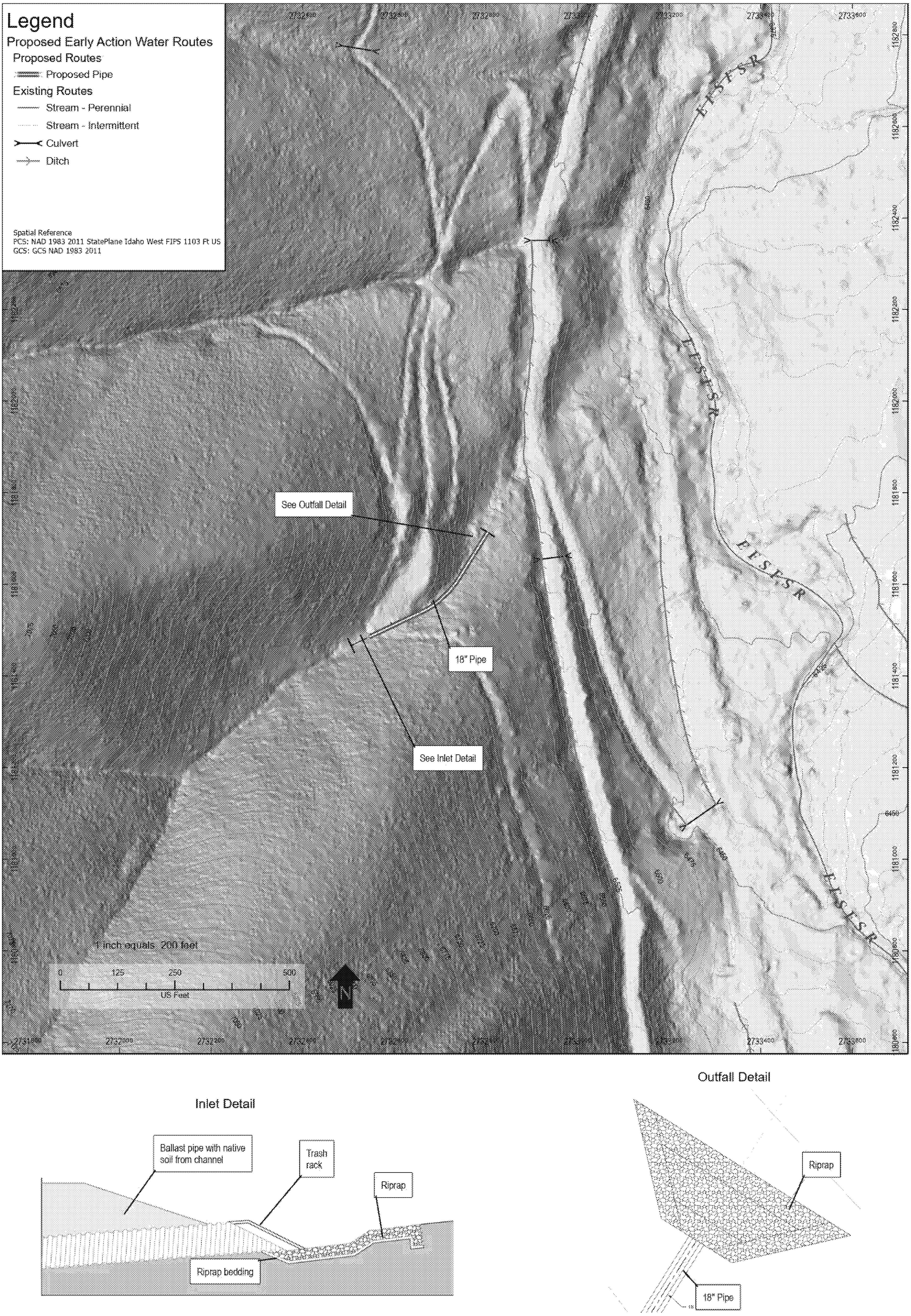

Figure 9 – Proposed Early Action Water Diversion Design for DMEA Waste Rock Dump Area

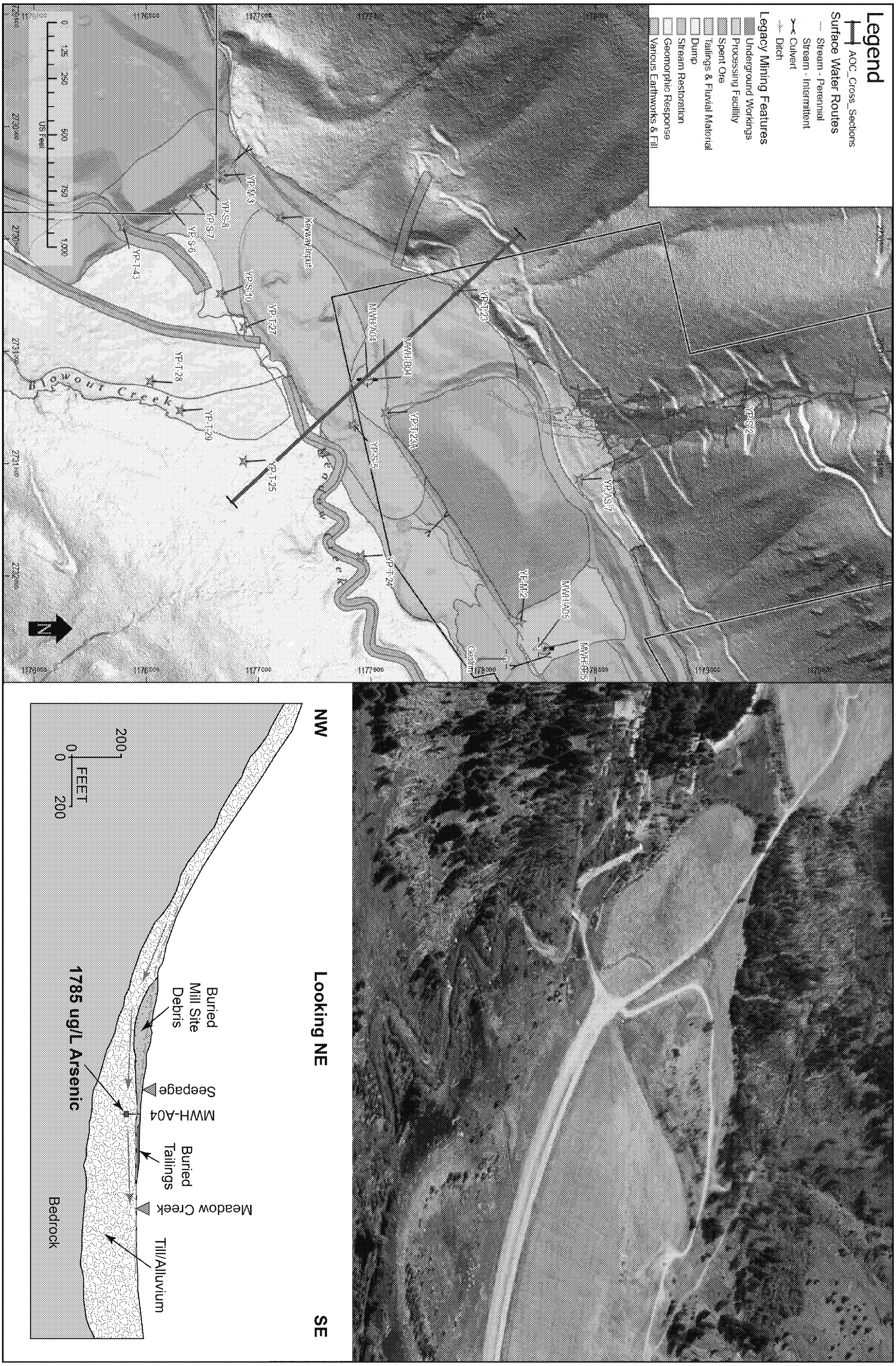

Figure 10 – Existing Conditions for Former Bradley Mill and Smelter Area

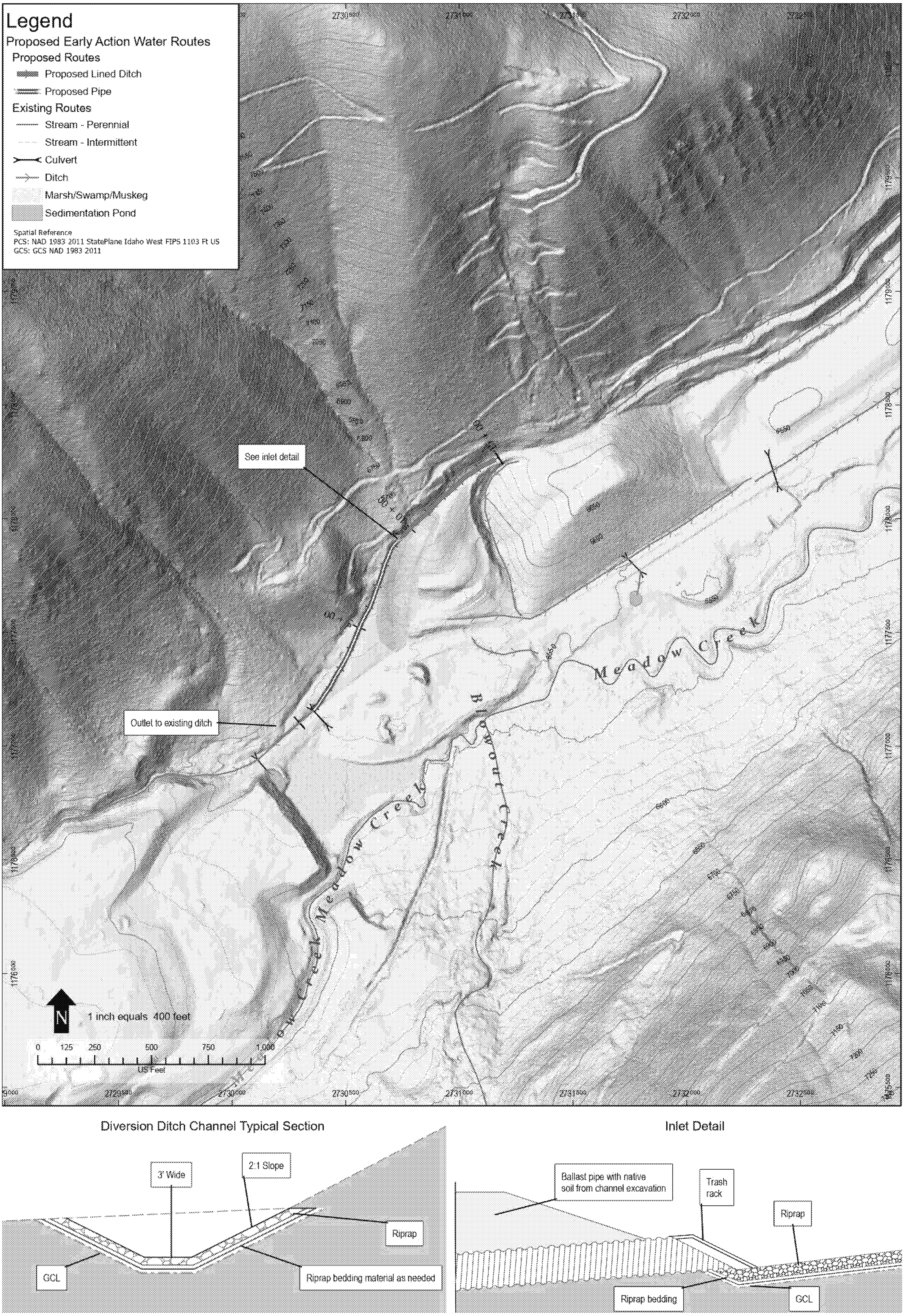

Figure 11 – Proposed Early Action Water Diversion Plan for Former Bradley Mill and Smelter Area